Original Article

Assessment of knowledge and awareness of artificial intelligence and its uses in dentistry among dental students

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Abstract

Introduction: Artificial intelligence (AI), in straightforward terms, can be characterized as the securing of insight by PCs or machines to perform assignments that typically require human knowledge.
Materials and methods: A survey based questionnaire was done to study the knowledge about artificial intelligence and its uses among dental students. A total questionnaire of 15 questions were collected by google form app. SPSS statistical analysis was done. A total of 100 participants participated in this survey.
Result: The results were collected and data were analysed. 84% of the participants were aware of the artificial intelligence and its uses among dental students. The difference of the result is statistically significant ($p<0.05$).
Conclusion: This study concludes that the majority of the participants were aware of artificial intelligence and its uses.

KEYWORDS: knowledge, awareness, artificial intelligence, dentistry, dental students, innovative technology
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INTRODUCTION:

Artificial intelligence (AI), in straightforward terms, can be characterized as the securing of insight by PCs or machines to perform assignments that typically require human knowledge. A couple of instances of such errands are discourse acknowledgment, dynamic, and clinical determination. A subset of AI, machine learning, can be utilized to encourage machines and computers to examine particular kinds of information utilizing different calculations(Wooldridge, 2020; Ko, Shen and Wang, 2021). Artificial intelligence programs have been created to examine information gathered from an assorted scope of sources, and AI frameworks have been broadly utilized in the assembling area, the securities exchange, the clinical field, and meteorology, among different areas(Vandana, 2017). India is a mechanically propelling country that still can't seem to arrive at its maximum capacity(Jain and Wynne, 2021). Among the age group of 18-60 years, 70% of individuals utilize cell phones in India, while 87% of 1.3 billion Indians approach a web association(Schwendicke and Krois, 2021). Numerous individuals, including specialists and researchers, are not yet acquainted with the ideas and genuine capability of AI, and the effect it can have on both our own and expert lives(Kaplan, 2016).

The clinical use of AI programs in the medical profession has gained popularity over the last few years, and its possible applications in dentistry also need proper attention(Kılıc *et al.*, 2021). Applications of AI programs in dentistry are quite interesting, especially in radiology, and AI can be a boon for novice dental practitioners(Marr, 2019; Katznelson and Gerke, 2021). AI programs can help in the tracing of cephalometric landmarks; in the detection of caries, alveolar bone loss, and periapical pathosis; the auto-segmentation of the inferior alveolar nerve; the analysis of facial growth, and other similar tasks(Ishak and Kadir, 2012; Sodhi *et al.*, 2021). Studies have reported the use of AI in the early screening of oral cancer and cervical lymph node metastasis, as well as in the diagnosis and treatment planning of various orofacial diseases(Ranschaert, Morozov and Algra, 2019). Our team has extensive knowledge and research experience that has translate into high quality publications(Sathivel *et al.*, 2008; Panda *et al.*, 2014; Govindaraju, Neelakantan and Gutmann, 2017; Johnson *et al.*, 2020; Saraswathi *et al.*, 2020) (Kumar *et al.*, 2006; Devi and Gnanavel, 2014; Varghese *et al.*, 2015; Sivamurthy and Sundari, 2016; Chen *et al.*, 2019).The main aim of the present study is to assess the knowledge and awareness of artificial intelligence and its uses in dentistry among dental students.

MATERIALS AND METHODS:

A convenient sample size of one hundred consecutive respondents participated during this study. A cross sectional observational online based study was conducted using Google forms with dichotomous response and multiple choice questions. The moral approval was obtained from the Institutional Ethical Committee. The questionnaire contains 15 questions based on knowledge and awareness of artificial intelligence and its uses in dentistry among dental students.

The data were collected and entered in excel and then it is converted into IBM SPSS V22 software for statistical analysis. Descriptive analysis was done and the correlation of data was carried out using Chi-square test.

RESULT:

Table 1: Responses of the questionnaire.

S. No	QUESTIONS	CHOICES	RESPONSES
1.	Are you aware of AI driven health care devices?	• Yes • No • Maybe	• 84% • 6% • 10%
2.	What according to you are the advantages of using AI?	• AI can deliver vast amounts of clinically relevant high quality data in real time • AI has no emotional exhaustion nor physical limitation • AI can speed up processes in healthcare and reduce medical errors • All the above	• 20% • 12% • 10% • 58%
3.	Are you familiar with the concept of AI and it's uses?	• Yes • No • Maybe	• 67% • 23% • 10%
4.	Would you like to use a software/ program that can be helpful in dentistry?	• Yes • No	• 79% • 21%
5.	Does AI help in clinical decision making?	• Yes • No • Maybe	• 81% • 13% • 6%
6.	Has AI improved doctor patient relationships?	• Strongly agreed • Agreed • Neutral • Disagreed • Strongly disagreed	• 42% • 31% • 12% • 5% • 10%
7.	Can AI establish a definite diagnosis?	• Yes • No • Maybe	• 59% • 31% • 10%
8.	AI can be used in the diagnosis of soft tissue lesions of the mouth.	• True • False	• 86% • 14%

9.	Can AI be used for radiographic diagnosis of tooth caries?	• Yes • No • Maybe	• 73% • 24% • 3%
10.	In which field of dentistry do you think AI will be most useful?	• Interpreting complicated radiographic scans • Direct treatment • Making a diagnosis • Making treatment decisions	• 52% • 32% • 13% • 3%

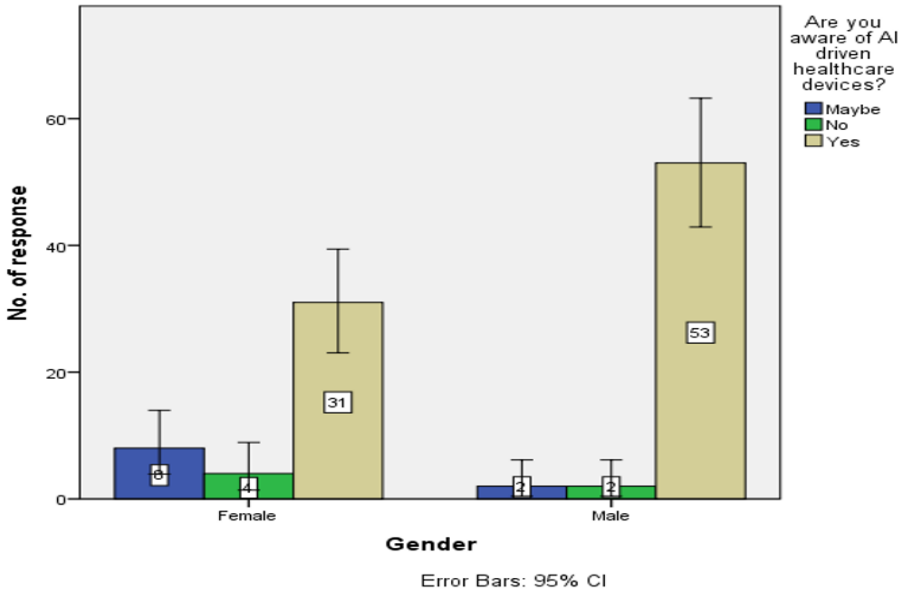

Figure 1: Bar graph showing the association between gender and the awareness of AI driven healthcare devices. X-axis represents the gender and Y-axis represents the number of participants of which blue colour indicates yes and green colour indicates no and beige colour indicates maybe. Majority of the males (53 participants) were more aware of AI driven healthcare devices than females. However the difference is statistically significant (Chi-square value-8.230 , p value-0.016 (<0.05) hence significant).

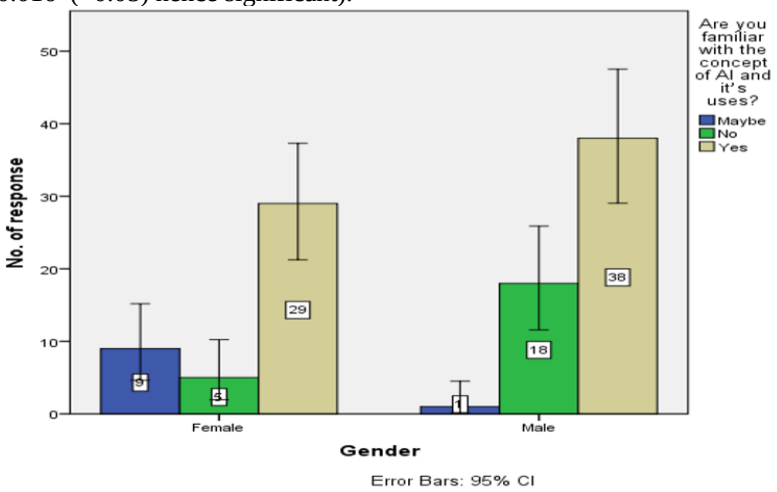

Figure 2: Bar graph showing the association between gender and the familiarity with the concept of AI and it's uses.

X-axis represents the gender and Y-axis represents the number of participants of which blue colour indicates yes and green colour indicates no and beige colour indicates maybe. Majority of the males (38 participants) were more familiar with the concept of AI and it's uses than females. However the difference is statistically significant (Chi-square value-13.257 , p value-0.001 (<0.05) hence significant).

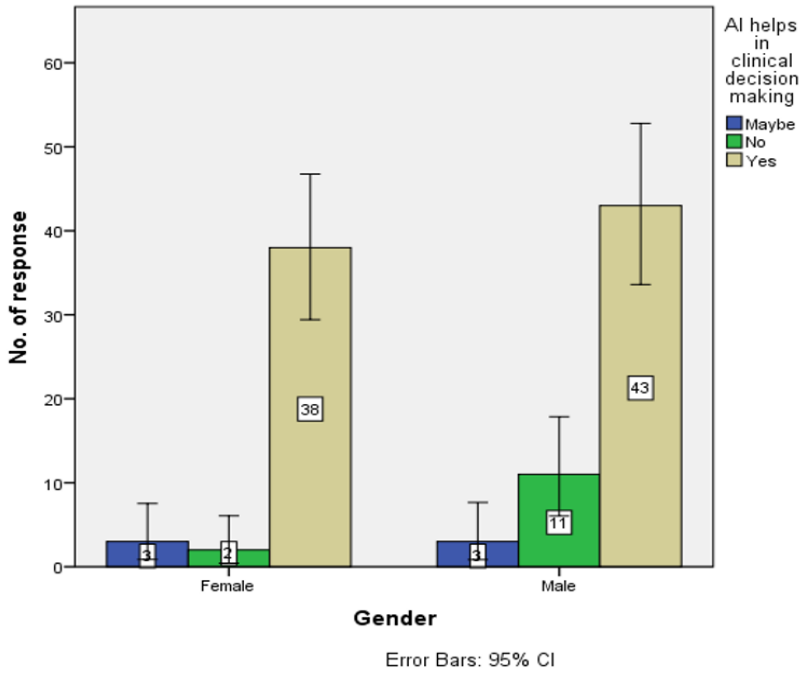

Figure 3: Bar graph showing the association between gender and the awareness of AI helps in clinical decision making. X-axis represents the gender and Y-axis represents the number of participants of which blue colour indicates yes and green colour indicates no and beige colour indicates maybe. Majority of the males (43 participants) were more aware of AI helps in clinical decision making than females. However the difference is not statistically significant (Chi-square value-4.671 , p value-0.097 (>0.05) hence not significant).

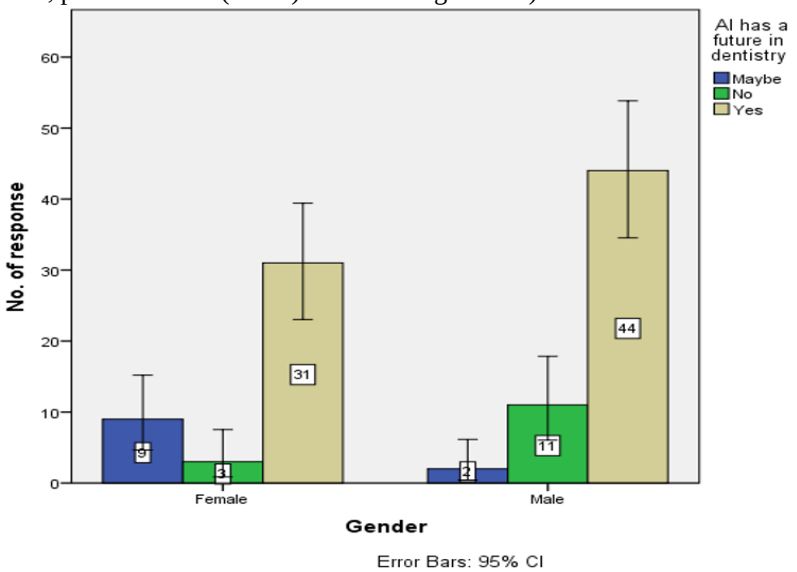

Figure 4: Bar graph showing the association between gender and the awareness of AI has future in dentistry. X-axis represents the gender and Y-axis represents the number of participants of which blue colour indicates yes and green colour indicates no and beige colour indicates maybe. Majority of the males (44 participants) were more aware that AI has a future in dentistry than females. However the difference is statistically significant (Chi-square value-9.506 , p value-0.009 (<0.05) hence significant).

DISCUSSION:

The results were collected and the data were analysed. A total of 100 students completed the survey questionnaire. Majority of the students who attended this survey were at the age 18- 20. There was a remarkable knowledge of artificial intelligence among the students. The percentage of participants who were aware of AI driven healthcare devices comprises 84% and 6% were not aware. 20% of the respondents thought that AI can speed up processes in healthcare and reduce medical errors, 12% of the respondents thought that AI can deliver vast amounts of clinically relevant high quality data in real time, 10 % of the respondents thought that AI has no emotional exhaustion nor physical limitation and 58% of the respondents chose all the above. 67% of the participants were familiar with the concept of AI and it's uses, 23% of participants were not familiar with it. 79% of the respondents were interested in using a software/ program in dentistry, 21% were not interested in it. The percentage of participants who thought AI helps in clinical decision making were 81%. The percentage of respondents who thought AI improved doctor patient relationships were 42% strongly agreed, 31% agreed, 12% were neutral, 5% disagreed, 10% strongly disagreed. 59% of participants thought that AI will establish a definite diagnosis, 31% of participants disagreed. 86% of participants thought that AI can be used in the diagnosis of soft tissue lesions of the mouth is true and 14% thought it is false. 73% of the participants thought that AI can be used for radiographic diagnosis of tooth caries and 24% of participants disagreed. 52% of the participants chose AI is used in interpreting complicated radiographic scans, 32% of participants chose direct treatment and 13% chose making a diagnosis. 75% of the participants thought AI has a future in dentistry in India and 14% of participants disagreed.

From the graph the majority of the males (53 participants) were more aware of AI driven healthcare devices than females. However the difference is statistically significant (Chi-square value-8.230 , p value-0.016 (<0.05) hence significant) (Figure 1). Majority of the males (38 participants) were more familiar with the concept of AI and it's uses than females. However the difference is statistically significant (Chi-square value-13.257 , p value-0.001 (<0.05) hence significant) (Figure 2). Majority of the males (43 participants) were more aware of AI helps in clinical decision making than females. However the difference is not statistically significant (Chi-square value-4.671 , p value-0.097 (>0.05) hence not significant) (Figure 3). Majority of the males (44 participants) were more aware that AI has a future in dentistry than females. However the difference is statistically significant (Chi-square value-9.506 , p value-0.009 (<0.05) hence significant) (Figure 4)(Hung *et al.*, 2019; Pauwels and Del Rey, 2021; Yüzbaşıoğlu, 2021).

Participants also stated that social media supplied them with more information than academics(Fotea, Fotea and Țundrea, 2019). Students with the highest levels of education, on the other hand, were the least terrified of this new technology(Arya, 2020). It suggests that undergraduate students have a lot of room to teach the core principles of AI(Bogdan and Popovici, 2012; Bhatia and Tiwari, 2019). It shows that there is plenty of room for undergraduate students to learn the fundamentals of AI(Rhienmora *et al.*, 2010). The present study has some limitations like the study population like small sample size as there were only 100 participants. We could create more awareness and let people understand the knowledge of artificial intelligence and its uses in dentistry among dental students

CONCLUSION:

Within the limitations of this study it is evident that most of the dental students are aware of artificial intelligence and its uses in dentistry among dental students. This survey brings about epidemiological significance about the knowledge and awareness of artificial intelligence and its uses in dentistry among dental students.

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CONFLICT OF INTEREST: The author declares that there was no conflict of interest in the present study

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